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ABSTRACT

One factor that contributes to the difficulty that a reader may encounter when reading a text is the syntactic complexity of the constructions used in the text. Examples of altered text constructions include the transformations of subjects of subordinate clauses, making them either the subjects or the objects of main clauses. When the conditions for such "raising to object" or "raising to subject" are examined, it is found that there are really just a small number of factors involved. For example, the noun phrase that is raised must be perceived as a good discourse topic in the discourse context where the sentence occurs. Differences of meaning among the variant forms can be accounted for as inferences from different surface structures. Extra inferred meanings are conveyed by the structures that are more complex to process according to absolute measurements of syntactic complexity. Syntactic complexity, however, is not an absolute value, because it may vary with discourse context and the function of the construction in discourse. An understanding of the relation between syntactic complexity and discourse function allows a writer to use more complex constructions without increasing text difficulty for the reader. (Author/RL)

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LINGUISTICS AND THE MEASUREMENT OF SYNTACTIC COMPLEXITY: THE CASE OF RAISING

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Abstract

One factor which contributes to the difficulty that a reader may encounter in reading a text is the syntactic complexity of the constructions used in the text. This report focuses on one particular type of sentence structure which would be difficult to process, according to most measures of complexity. This construction type also poses a problem for linguistic theory, because it is hard to describe adequately in terms of syntactic transformations. The problem is that the transformations in question, which relate variant sentence forms within the construction type, appear to have conditions on them which are complex, variable, and related to meaning as well as syntactic form. The report examines the conditions on the rules of Raising to Object and Raising to Subject, and proposes that there are really just a small number of factors involved. For example, the NP which is raised must be perceived as a good discourse topic in the discourse context where the sentence occurs. Differences of meaning among the variant forms can be accounted for as inferences from different surface structures. Extra inferred meanings are conveyed by the structures which are more complex to process according to absolute measurements of syntactic complexity. It is proposed, however, that syntactic complexity is not an absolute value, because it may vary with discourse context and the function of the construction in discourse. An understanding of the relation between syntactic complexity and discourse function allows a writer to use more complex constructions without increasing text difficulty for the reader.

Linguistics and the Measurement of Syntactic Complexity: The Case of Raising

In this paper, I want to show that a solution to a problem in linguistic theory can have some general application to defining "complexity," features of language which can contribute to difficulty in reading. Certain sentence constructions, including ones which subordinate clauses in them, have a reputation for being more complex, harder for the hearer or reader to process, and therefore somewhat harder to read than other constructions. Writers and editors who want to use simpler language in creating or adapting children's texts often alter or delete these constructions. I want to examine the criteria used for defining "complex" and inherently difficult constructions, to show that they are justified to some extent, but that there is another important dimension to complexity which has not been well defined or often taken into account.

The particular case to be studied here involves the transformational rules Subject to Subject Raising and Subject to Object Raising, which apply in main clause-subordinate clause sentences, and relate supposedly synonymous sentences as illustrated in the following two pairs of sentences.

(1a) It seems that the raccoons are eating the garbage.

(b) The raccoons seem to be eating the garbage. (Subject to Subject Raising)

(2a) John believes that he/*himself is responsible.

(b) John believes himself/*he to be responsible. (Subject to Object Raising)

In (1a), raccoons is the subject of the subordinate clause, which is marked

by the complementizer that and functions as the subject of seem. In (1b), the plural verb agreement shows that raccoons is the subject of seem, and the boundaries of the main and subordinate clauses are no longer apparent. In (2a), the nominative case of he marks the pronoun as the subject of is responsible, in the that clause which is the object of believe. In (2b), the reflexive pronoun himself shows that the pronoun is no longer the subject of the lower and instead is object of the main clause. Again the clause boundaries have become unclear. (The standard arguments for this account of the syntax of these sentences can be found in general works on transformational grammar such as Akmajian & Heny, 1975; and Bach, 1974; and the analysis is justified in greater detail in Postal, 1974.)

One of the questions which I want to address in this paper is whether it is legitimate to speak of such sentences as being related syntactically, when many people find them slightly different in meaning. The perceived differences in meaning have been surveyed in Bach (1977) and Postal (1974), and the points made in these and other works will be discussed more fully in later sections of the paper. It is not disputed that (1a) and (2a) are very similar in meaning to (1b) and (2b). But given that a sentence in which a raising rule has applied conveys a somewhat different meaning from the corresponding sentence in which the rule has not applied, one may ask if it is possible to assume that these sentences are syntactically related by being derived from the same underlying structure from which semantic interpretation is derived.

What I want to justify here is the proposal that the pairs of sentences like (1) and (2) are related by the optional application of rules of Raising,

which do not alter meaning in a strict sense. Instead, the sentences convey different readings because of different possible inferences based on the surface structure of the sentences. This proposal preserves the assumptions that transformations do not change meaning relevant to the truth conditions of the sentence, and that meaning is derivable from an abstract level of representation such as deep structure or a semantic structure.

These assumptions are rejected in work such as Bresnan (1976) and Chomsky and Lasnik (1977), in which the relation between (2a) and (b) is no longer expressed by a transformational rule, and the syntactic relation between (1a) and (b) is simply part of a more general movement rule. Alternatively, one could postulate, as in Postal (1974), that (1a) and (2a) are different from (1b) and (2b) because they are derived from different underlying structures. The rules of Raising must apply only if the underlying structure contains some set of assumptions (perhaps represented as presuppositions), and this element of meaning is absent where Raising does not apply. Raising is therefore considered a rule whose application is subject to some semantic factor associated with the sentence's deep structure.

As I wish to propose that the Raising rules are optional transformational rules which do not change meaning, I will have to offer an explanation for how there comes to be a difference between the meanings conveyed by different surface structures. The explanation which I will propose involves the idea that some structures are inherently more complex to process than other structures which are semantically equivalent to them in that they express the same grammatical and logical relations. The notion of inherent complexity will be further examined, and I will argue that complexity is not an absolute

value, that it is dependent on discourse factors such as topic, and features of the speech act the speaker is performing by uttering the sentence.

Definitions of Inherent Complexity

There are various approaches to predicting what kinds of structures will be difficult for the hearer or reader to assign correct syntactic structure and semantic interpretation. These approaches range from very general formulas based on sentence length and word frequency, to very specialized descriptions of grammatical relations (agent, recipient, instrument, etc.) and hierarchical relations among constituents, such as subordination. Among these latter would fall the parsing models of Bever (1970), Frazier and Fodor (1978), Frazier (1979), and Kimball (1975). These models are general procedures for grouping syntactic constituents such as nouns, verbs, etc. into larger constituents by matching linear strings of words to standard patterns. The more difficult constructions are the ones which require more attempts to analyze and identify the correct syntactic structure.

The sentences which illustrated the application of Raising transformations could be measured for probable complexity according to the four criteria listed below.

Criterion A--Clause complexity. The longer the sentence, the more likely it is that it contains internal clauses, or clause-like subconstituents. Bormuth (1966) has shown a high correlation between length and clause complexity. It is assumed, at least by proponents of readability formulas, that long sentences with subordinate clauses are harder to process than short and un-complex sentences.

Criterion B--Transparency of grammatical relations. The surface structure of a sentence may give accurate indications of the underlying grammatical relations, so that the agent, object, recipient, etc. are easily identified. If word order, verb agreement, and so on do not directly indicate the underlying grammatical relations, the structure is hard to process.

Criterion C--Subject and topic correlation. The noun phrase in subject position is generally perceived as the sentence topic, unless such an inference is unreasonable in the discourse context. If the NP in subject position does not refer to something that has been picked out in the previous discourse, the sentence is hard to process, as is the sentence in which the discourse topic has been placed in some other position in the sentence than in subject position.

Criterion D--Hierarchical regularity. If the contents of the grammatically subordinate constituents are not also logically subordinate, the structure is harder to process than a structure where grammatical subordination matches logical and discourse subordination.

By the above Criteria A, B, and D, the structures in which Raising has applied, (1b) and (2b), would be complex. By Criteria A, C, and D, the corresponding sentences in which Raising has not applied would also be predicted to be hard to process. The specific features of the sentences will be discussed below.

Criterion A is a commonly applied criterion, one which follows from readability formulas based on the number of words or syllables in a sentence. It has been shown in a study of the predictions made by readability formulas and other measures (Bormuth, 1966) that the length of a sentence is

correlated with the degree to which constituents are embedded in it. It is fairly obvious that a sentence could not have several embedded clauses in it and not be fairly long. Certainly such a sentence would generally be longer than the average sentence with no internal clause constituents. If a sentence does contain internal constituents, the hearer or reader has to identify the beginning and end of the embedded structure, as well as its category. This is part of the task which is modeled by the parsing strategies described in (b) below. In any case, the structures in (1) and (2) would be characterized as more complex because they both contain subconstituents.

Criterion B is related to parsing strategies which assign the grammatical relations to strings of constituents (for general discussion of parsing strategies see Frazier, 1979). One of the strategies discussed in Bever (1970) assigns the grammatical roles Actor-Action-Object to strings of words where the words belong to the categories Noun-Verb-Noun, in that order. This is a very general strategy which can be applied with correct results in many cases. But it gives incorrect results if the verb is one of a subclass of verbs, like receive or resemble, whose subject is not an Actor or volitional agent. It gives incorrect results also in sentences where Raising rules have applied, because the grammatical roles of the underlying structure do not match the grammatical roles indicated in the surface structure.

For example, in (1b), raccoons is no longer the surface subject of are eating after Raising to Subject has applied. Instead, it is the subject of seem. Yet raccoons should be identified as the Actor associated with eat, and not with the non-volitional abstract subject which goes with seems.

The grammatical relations in a sentence in which Raising to Object might apply are indicated schematically in (4):

(3a) We believed that Benedict Arnold gave information to the enemy.

(b) We believed Benedict Arnold to have given information to the enemy.

(4a)
We	believed	that Benedict Arnold	gave information	to the enemy.
N	V	N	V N	prep N
Actor	Action	Actor	Action Object	Recipient
			Object	

(b)
We	believed	Benedict Arnold	to have given information to the enemy.
N	V	N	V N Prep N
Actor	Action	Object / Actor	Action Object Recipient

In (4a), the grammatical rules straightforwardly follow the surface order, and can be assigned in accordance with them. On the other hand, in (4b), it is hard to assign the correct grammatical relations to Benedict Arnold. Its position following the verb believe should make it an Object since there is no that complementizer to signal the beginning of an embedded sentence. But its position preceding to have given should assign it the role of subject. The point I want to make here is that the grammatical relations of (4b) are not transparent; that is, they cannot be straightforwardly assigned on the first try just on the basis of category information (i.e., whether the word belongs to the category N, V, etc.), semantic information about the V, linear order, and markers of syntactic boundaries.

In contrast, the assignment of relations in (4a) is much more straightforward. It might therefore be predicted that structures like (4b) would be more difficult to process than (4a). It is reasonable to suppose that the usual case in languages like English is for the Actor to precede the Action and for the Object to follow, and that is generally true unless there

are signals, like inverted word order, that the normal pattern does not apply. An example would be Nectarines we don't have, parsed as N N . . . V.

Criterion C: Generally speaking, the subject position of a sentence in English is occupied by a Noun Phrase which could be reasonably interpreted as the topic of the sentence (the individual or whatever the predicate is predicated of) and the topic of the immediately preceding discourse. The notion topic has been of interest to linguists for some time, because it seems to interact with sentence structure in many languages (see Li, 1976, for papers on a range of languages). Unfortunately for linguists, it is not a term which can be easily defined in formal terms (see Li, 1976, for attempts to define topic from several points of view). It seems to be in essence a discourse-related notion, not a grammatical category, perhaps derived by inference from discourse context and syntactic surface structure. It may be marked by the same devices which mark grammatical categories, though not in all sentences, and not in all languages.[1] The implications for processing passive sentences have been explored in Perfetti and Goldman (1975), Gourlay (1978), Gourlay and Catlin (1978), and Levelt (1978).

Languages (apparently) have optional rules, or choices of constructions, for which there is no functional explanation other than the fact that such constructions tend to make a topic Noun Phrase more easily spotted by the hearer or reader. Suppose that the previous discourse has been about a certain object X, and the speaker wants to communicate something more about that thing, in a sentence in which its grammatical role is that of direct object. If the speaker puts the direct object in subject position, in a passive sentence, it is clearer that the item X continues to be the topic of

discourse, the thing which the passive sentence is "about," than if the NP referring to X were in object position after the verb, where it would normally be consigned as a direct object. Marking the topic in some overt way is not obligatory in English sentences, in contrast to Japanese. Yet there are many devices for marking topics in English, and making use of them is a way of maintaining continuity in discourse.

Though topic marking is not obligatory for each individual sentence, a discourse in which the individual sentence topics are not marked, or are not consistent, will give the impression of being disconnected, not "about" anything easily identifiable, or of having many shifts of topic. The context of utterance and common knowledge shared by the speaker and hearer may go a long way to repairing any such possible defects in the discourse form. But in written language it is more likely that it is useful or necessary for correct interpretation. So the notion of topic ought to be an issue in measuring readability. It is no doubt an issue in teaching composition to older students. But aside from some psycholinguistic experiments with younger children on passive sentences (for example Gourlay & Catlin, 1978, reported in Gourlay, 1978), there does not seem to be much importance given to topic in children's reading material, other than what would follow from the common sense of writers and editors.

By the topic marking criterion, a sentence in which Raising to Object has applied ought to be more difficult to process than a similar sentence in which it has not applied. The subject and potential topic of the lower clause has also become the object and non-topic of the higher clause. Of course, it might be moved to subject position by Passive, in which case it

would be the topic of the higher sentence. The same result is achieved by Raising to Subject, which moves the subject/topic of the lower clause into subject/topic position of the higher clause. (This fact may explain why there appear to be different restrictions on raising NPs to different positions in a sentence, in English and other languages.) The notion of topic and requirements placed on the raised NP will be closely related in the following discussion.

Criterion D: It has been noted (Hooper & Thompson, 1973) that there are declarative sentences in which the material of the subordinate clause constitutes the statement made in the sentence. The higher clause, as in (5), is not part of what is asserted, and in fact its presence often does not prevent rules from applying which normally do not apply in subordinate clauses (Hooper & Thompson).

(5a) I think that they'll come at 4:00.

(b) They'll come at 4:00.

(6a) Most scientists believe that Mendel's theory was correct.

(b) Mendel's theory was correct.

The (a) sentences can be used simply to make assertions equivalent to the (b) sentences, which do not have a higher clause. This is not necessarily the case, of course, as (5a)-(6a) may be used to assert thinking or belief, in which case the (a) sentences present no difficulty of interpretation.

But in the other and more ordinary usage, what is syntactically higher is interpreted as subordinate, and the contents of the subordinate clause are more prominent, as though the higher clause were absent, or served instead as an abverbial modifier. The surface syntactic relations do not give an adequate indication of the relative prominence of the component

clauses. Somehow the hearer or reader has to construct some other interpretation. Clearly one of the factors which is crucial to this is the verb in the higher sentence, which is generally one indicating belief, perception, or some other kind of epistemic qualification. The general class of such verbs will turn up again in connection with the cases of Raising where "meaning differences" are encountered. In any case, even without Raising, the occurrence of epistemic non-factive verbs in higher sentences requires some additional processing, and hence such sentences would tend to be more difficult to comprehend, if only marginally so.

(7a) I suppose Fred will bark at the mailman, won't he?

(b) Fred will bark at the mailman, won't he?

In the sections which have just preceded, I have described four different criteria which would be used in predicting the relatively greater difficulty of structures in certain English sentences, compared with sentences which did not contain subordinate clauses, epistemic verbs, or inconsistently marked grammatical relations and topic NPs. The structures in which the Raising rules could apply have just these characteristics, and so ought to be relatively more difficult to process inherently. This is particularly true of sentences in which Raising rules have applied, since the rules obscure the embedded sentence boundary, change grammatical relations, and affect what is in topic position, as well as forcing the "subordinate" interpretation of epistemic verbs like believe.

Note that these criteria, except for the first, A, all make stronger predictions than the usual readability formulas, which measure very general features such as length of sentences expressed in number of syllables or

words; these are described in some detail in works like Klare (1963). Readability formulas would not make any distinction of predicted difficulty between the structures in which Raising has applied and comparable structures where it has not applied, since the length of the sentences is more or less the same. Yet I believe that structures in which Raising rules have applied are considered inherently difficult by writers and adaptors who create texts for children to read. For example, a study which compared original and adapted versions of texts used as material for reading practice (Davison, Kantor, Hannah, Hermon, Lutz, & Salzillo, 1980) noted the syntactic and other changes which were made in order to lower the level of reading difficulty of the texts. Among these were the substitution of structures in which Raising had applied for some paraphrase. For example:

(8a) (original version) It is said to be the biggest, and perhaps the oldest living thing in the world.

(b) (adapted version) It may be the biggest and oldest living thing in the world.

(9a) The Romans were said by Pliny to rub bread soaked in asses' milk on their faces to make them fairer and to prevent the growth of beards.

(b) The Romans rubbed bread soaked in milk on their faces. They thought that this would make their skin paler. They also thought this would keep their beards from growing!

(10a) Hippocrates recommended milk as a curative beverage.

(b) One of the most famous Greek doctors told his patients to drink milk to cure illness.

The paraphrases which have been substituted in the (b) versions would indeed be easier to process, and probably easier to read, than the original

(a) structures, at least by the four criteria which I outlined. (Of course, it might be argued that the paraphrases do not convey exactly the same meaning as the original.)

In the main body of this study, I want also to attack the idea that structures in which Raising rules have applied are in fact inherently more difficult to process than equivalent structures where Raising has not applied, or even more difficult than sentences with fewer clauses. Defining inherent difficulty by Criteria A, B, and D does not take into account the discourse context in which the sentence in question is used. I want to propose that raised structures may be inherently harder to process, because of Criteria B and D in particular. But what determines if they are actually more difficult to process in a given discourse context is something like Criterion C, which defines sentence topic in conflict or in congruence with expectations which have been aroused by preceding discourse. This in turn will lead me to talk about which raised structures can be used to communicate, which are not communicated, or conveyed as well, by the unraised structures.

There is a common link between questions about characterizing the difficulty of a particular construction, with implications for its contributing to difficulty of reading a text, and the question of how to account for the apparent anomalies attached to the transformational rules of Raising. These anomalies will be discussed in detail in the following sections. The anomalies are connected with exactly the factors mentioned in the criteria for predicting relative difficulty of constructions. For this reason, I believe that an adequate answer to one set of questions also answers the others. Two

apparently unrelated issues, in the study of difficulty in language learning or in reading, and in the statement of syntactic rules, actually share common ground.

Strange Properties of Raising Rules

The discussion about the transformational rule(s) of Raising centers on the syntactic relationship between (11a)-(12a) and (11b)-(12b).

(11a) We believe that he is honest.

(b) We believe him to be honest.

(12a) It seems that Carola is inebriated.

(b) Carola seems to be inebriated.

Under the standard transformational analysis (such as that outlined in Akmajian & Heny, 1975; and Bach, 1974), the subject NP of the subordinate clause is raised into the higher clause, and assumes the same grammatical role, subject or object, that the source clause occupied. The subjectless subordinate clause ends up in final position in the VP of the higher sentence,[2] roughly speaking. The syntactic details will be discussed on p. 34.

The (b) sentences in (11) and (12) are therefore derived from the same underlying structure as the (a) sentences, with the difference that the complementizer that appears in the (a), unraised structures, and to appears in the raised (b) structures. The option of applying Raising is therefore related to the choice of complementizer. (There is a third complementizer, as, which does allow Raising; since the to cases do not differ significantly from these cases, I will mainly discuss just the to examples.)

I have just discussed reasons why the ouput of the Raising transformation ought to be considered more difficult structures to process than

unraised structures. But so far as I know the transformational operations involved in Raising have not been considered from the point of view of discourse function, that is, from the point of view of the speaker's motivations in speaking, or the choices available about how best to communicate it. Ordinarily, speculations on such issues would have no legitimate place in the formulation of a transformation, or any other purely syntactic mapping or statement of equivalence between one structure and another.

It turns out, however, that a transformational account of the relationship between raised and unraised corresponding structures runs into some extrasyntactic problems, described in Postal (1974, chapter 11), and further explored in Borkin (Note 1) and Bach (1977). Each of these will be discussed shortly but either the raised sentence appears to mean something "different" from the unraised one, or the ranges of meaning associated with the unraised version are greater than in the sentence in which raising has applied. This would mean that the rule is obligatory, if some set of special assumptions is associated with the sentence, or that its application might be blocked, if the NP subject which is a candidate for Raising has the wrong properties, and if the predicate is of the wrong sort. The assemblage of conditions, however complex, might be incorporated into the grammar with some reluctance, but there is a further problem that the restriction and meaning differences are not consistent from one speaker to another. Speakers disagree in judgments about well-formedness of sentences, and about the meaning differences between the raised and unraised cases. In fact, speakers of English whose judgments I have recorded agreed that the raised and unraised counterpart

sentences differ in some very specific way, but some of them assign the different meanings to exactly opposite structures.

In what follows I will give some examples of the kinds of differences which have been reported by various writers. I do not want to claim that all speakers of English will agree with the descriptions of meaning summarized here, but I think it is important to look at the range of differences which have been reported for at least some speakers. I will propose a solution which takes into account the variability or fugitive quality of judgments.

A. The raised sentence conveys that the speaker (or subject of the higher verb) has personal and direct knowledge about the referent of the NP which has been raised. Compare the (a) and (b) sentences below:

(13a) We believe that Winston is obstinate.

(b) We believe Winston to be obstinate.

(14a) It struck me that Julius Caesar was honest. (Postal, 1974, p. 357)

(b) Julius Caesar struck me as honest.

(15a) It just now struck me that my wife has been dead two years tomorrow.

(b) *My wife has just now struck me as having been dead two years tomorrow. (W. Cantrall, cited in Postal, 1974, p. 357)

(16a) It seems that Bill is drunk. (J. Morgan, personal communication)

(b) Bill seems to be drunk.

The (a) sentences are more or less neutral, implying nothing about the basis for the speaker's knowledge of the state of affairs described in the subordinate clause. But the (b) sentences generally convey that the speaker has first-hand knowledge of the referent of the NP which has undergone

Raising, and that the "judgment expressed is a function of this experience" (Postal, 1974).

Postal regards the differences between (13a)-(16a) and (13b)-(16b) as "a function of differences in meaning" (1974, p. 357) which persists under question and negation (1974, p. 358). The application of Raising is therefore linked to the presence of a set of special assumptions, expressed as part of the semantic structure of the sentence. Even if the (a) and (b) sentences are felicitously uttered under different conditions of speaker belief about the same proposition, it is not necessary to conclude that meaning differences are involved, especially ones which are relevant to the truth conditions of the sentence as a whole. It is a mistake, in my view, to equate the propositional contents of an assertion or question, etc. with the grounds for asserting a statement or the answer to a question. The grounds for performing a speech act are expressed in the same terms as the contents of a speech act, yet treating them all in the same way leads to paradoxes (Boer & Lycan, Note 2). The difference between the (a) and (b) sentences above seems to me to be less a difference of the truth conditional meaning of the contents of the proposition asserted or question, and more a difference in strength of an assertion, or solicited information. It is a common observation that assertions may be made on strong or weak grounds, on the basis of supposition and guesses, or on the basis of first-hand personal knowledge.

B. Some instances of raised and unraised counterparts differ in that the raised case is ill-formed, strange, or, as in the previous set of cases, lacks the range of meaning possible with the unraised case. In the latter case,

then, one possible interpretation is ill-formed in the raised case. Some of these are derivative from the preceding cases, where first-hand knowledge is or is not involved. (17b) is odd for this reason, while (18b) is odd because one can only have first-hand knowledge of oneself, hence no contrast should be possible:

(17a) It has just now struck me that my wife has been dead for two years.

(b) ??My wife has just now struck me as having been dead for two years. (W. Cantrall, cited in Postal, 1974, p. 357)

(18a) I believe that I am flying over Patagonia.

(b) ?I believe myself to be flying over Patagonia. (Ibid)

Tomoda (1976-77) notes that in Japanese, the Raising to Object rule produces sentences analogous to (18b), which are taken to reflect the speaker's point of view. Sentences which could be taken to reflect the speaker's point of view, and where Raising has not applied, like the counterparts in Japanese of (18a) are anomalous.

Raising in English may produce strange results like (17b) or (18b), and the strangeness may be expressed in terms of what the speaker could not have as first-hand knowledge (17b), or what the speaker must have as first-hand knowledge (18b). Not applying Raising in Japanese to the counterparts of (18) produces an anomalous sentence equivalent to the well-formed English sentence (18a). The strangeness of the ill-formed sentence in Japanese would also be expressed as a result of the sentence form being incompatible with the assumption that the speaker must have first-hand knowledge of him or herself. So first-hand knowledge is a factor governing the application of the rules of Raising in both English and Japanese, but it has different

effects--specifying the rule output as ill-formed in English and as well-formed in Japanese. If one is interested in how the "same" rule is realized in different languages, the inconsistency between English and Japanese just described here is very puzzling. It is particularly troublesome if something referring to first-hand knowledge must be made part of the semantic structure or of the syntactic formulation of the transformational rule. Later I will propose an alternative way of explaining this condition.

In other sentences where Raising is at issue in English, the well-formedness of the output of the rule, or the range of the possible interpretations which the output may have, are linked to the kind of NP which is moved by the rules. It is well known that referring expressions like definite NPs can be used in radically different ways with no apparent difference of form. One such distinction is the difference between the referential and attributive uses of definite noun phrases (Donellan, 1971). Under the attributive reading, the speaker and hearer identify the referent solely on the basis of the description provided. The NP refers then to whatever individual matches the description. Under the referential reading, the speaker uses the NP description as a convenient means of identifying a referent which the speaker already has in mind. In this case, the description need not exactly match the properties of the individual referred to. It is not clear that this is a semantic disctinction, as the context of utterance will have an influence on the readings which are preferred or possible in a given instance.

Application of Raising usually rules out the attributive reading for the raised NP. This is noted in Borkin (Note 1) and illustrated in (19).

Bach (1977, p. 642) discusses a similar difference between the specific and nonspecific interpretations of indefinite NPs.

(19a) It seems to us that Smith's murderer is insane. (referential/attributive)

(b) Smith's murderer seems to us to be insane. (referential/*attributive)

(20a) We supposed that a rodent had been attacking the carrots. (specific/nonspecific indefinite)

(b) We supposed a rodent to have been attacking the carrots. (specific/*nonspecific)

(21a) It may have happened that a man in a black hat came into the bar. (specific/nonspecific indefinite)

(b) A man in a black hat may have happened to come into the bar. (specific/*nonspecific indefinite)

(19a)-(21a) could be used with either of the possible interpretations, all other things being equal. But it would be strange, except in unusual circumstances, to use (19b) without some clear idea who Smith's murderer is, or to use (20b)-(21b) without having strong grounds for believing that a rodent in the garden really exists or that there is a man in a black hat who the speaker could identify. The judgments are fairly subtle, and a difference is not necessarily perceptible in every possible sentence. Yet the reported judgments are not at all surprising.

The raised structure implicates personal acquaintance of the speaker with the referent of the NP, in cases where a proper name is used to refer to an individual who is assumed to be existent and unique. In other cases, where description rather than names are used to refer, the raised structure allows the kind of reference which is most compatible with direct acquaintance.

The referential reading of a definite description is the closest match to direct knowledge, as the speaker has a particular individual in mind. The specific indefinite reading is also compatible in this way, as under this reading the existence of the referent is assumed, or asserted first, whatever other predicate is involved. Personal acquaintance, the referential reading, and the specific indefinite reading are all part of the same phenomenon, though it is not immediately clear which is the crucial factor from which the others follow.

Borkin (Note 1) describes in great detail some other factors which favor or inhibit Raising to Object position. She summarizes judgments on sentences in the term of hierarchies, the items belonging to one end of which undergo Raising with well-formed results. Those on the other end generally make the output strange or ill-formed if they undergo Raising.

(22) Hierarchy of Noun Phrases

a. Referential NPs, reified NPs known through personal knowledge, referentially transparent descriptions (attributed to the speaker), existential <u>there</u>.

b. Attributive NPs, definite NPs; <u>a</u>, <u>some</u> N; abstract NPs; referentially opaque NPs.

c. Generic <u>any</u>

d. Non-referring NPs, superlatives, <u>it</u> (weather), empty NPs like <u>tabs</u>, <u>the jig</u> (discussed in more detail in Steever, 1977).

This hierarchy subsumes some of the properties of NPs discussed in the preceding sections.

Borkin has also investigated more closely than any other writer on Raising the properties of the complement clause out of which a NP is raised

to object position. Certain kinds of predicates are more compatible than others with the to complementizer whose presence makes Raising obligatory. These are generic and stative predicates, which match the tenseless character of infinitive clauses, which not only generally lack morphologically expressed tense, but which also lack reference to specific events, all other things being equal (cf. Riddle, 1975). Under the same circumstances, a tensed that clause at least implicates reference to a specific event, particularly if the tense is not the simple present. This is not necessarily the case; the English language has various means of indicating specific or generic time reference in both finite and infinitive clauses. But Borkin's contrast of the corresponding that and to has convinced me that there is a clear difference of acceptability, determined more or less by the following factors (summarized from Borkin, Note 1):

(23) For to (as)

a. Non-specific time reference

b. Proposition expresses subjective judgment; the proposition is not objectively verifiable.

c. The proposition expresses a non-temporary, non-accidental attribute, which is likely to be stative.

d. The higher predicate is non-factive, so the proposition may not be presupposed to be true.

(24) That complementizer

a. Reference to a specific event (further discussed in Riddle, 1975).

b. The proposition constitutes an objective judgment, empirically verifiable.

c. The proposition may express a temporary, accidental state of affairs, which may therefore be non-stative. It also may contain what Kuno calls a "neutral" description.

d. The higher predicate may be factive, so the proposition may be presupposed to be true.

Again, the properties in (23) which favor Raising and those in (24) which would inhibit Raising if they were to occur in to clauses are fuzzy tendencies, whose influence may not be apparent in every conceivable example, and about which individual speakers may differ. But I think they hold as Borkin has described them for at least some sentences. They are interesting because they do exist in some sense as conditions on Raising, and because they do not hold absolutely and consistently all the time.

Having constructed this synopsis of all the peculiar conditions on Raising that various writers have noted, I want to ask whether any sense can be made out of them. As they stand, they represent a complicated and semi-coherent set of conditions on Raising, which might indeed be sufficient to force one to the conclusion that there is something very complex about sentences in which the rule is deemed to have applied. But I think there is another view, which rests on two notions which are not, strictly speaking, part of a theory of syntax. This is described below.

These notions are conversational implicature, following Grice (1975), and topic, as discussed earlier in the paper. There is perhaps a third important notion, the distinction between the contents of an assertion or other speech act, and qualifiers which comment on the speaker's attitude towards the contents or the speech act itself. This almost metalinguistic

content gets expressed in the same way as the propositional contents of the assertion or other speech act.

First, I want to propose that the restrictions on NPs which undergo Raising, or rather the factors which favor Raising, define just the characteristics of what is perceived in a topic NP. Kuno (1973), discussing the marking of NPs in Japanese with the topic marker wa, notes that the NPs which can felicitiously be marked with wa are either generic or anaphoric. That is, their reference is either completely general, and the existence and identity of their referents can be taken for granted, or else they refer to individuals previously mentioned, whose identity is completely clear to the speaker and hearer. Assuming that something of this definition of topic NP can be carried over to subject-topic languages like English which do not have a topic particle like wa, we see that NPs whose referent is directly known to the speaker, or to which the speaker refers on grounds stronger than just deduction or supposition about their existence, are NPs which are excellent candidates for being the topic of the utterance in which they occur. Abstract NPs have no referent that the speaker could be personally acquainted with, except in a figurative sense. Generic any may fail to define a clear topic because it does not guarantee that there is a referent for the NP; that is, it does not always have existential import.

There in existential sentences is an exception to the generalization of the preceding paragraph. Clearly, there undergoes Raising with absolute impunity:

(25a) There seems to be fly in my soup.

(b) We believe there to be a serious crime wave in Metropolis.

(c) ??We believe a serious crime wave to be in Metropolis.

(d) We believe there to be unanimity among the discussants.

(e) ??We believe unanimity to be among the discussants.

There-Insertion is analyzed as taking place in sentences whose subject is indefinite, and therefore not the very best kind of topic, particularly as the collocation there is conveys a statement about existence (cf. Milsark, 1977). The referent of the indefinite NP is therefore not assumed to be known to the hearer, as it has not been previously mentioned. It would therefore not constitute a good topic on a number of counts. If it remained in subject position, it could undergo Raising, with the kind of ill-formed results, reported in Borkin (Note 1), but it is displaced by There-Insertion to a position somewhere to the right of subject position. The semantically empty there serves as a place-holder, keeping out of topic position a NP which would make an inferior and unsatisfactory topic. (Milsark, 1977, remarks that it is a commonplace observation that the indefinite subject in sentences in which There-Insertion applies is never the topic of the sentence.) An "unsatisfactory topic" does not of course render the sentence ungrammatical; see below.

I propose, therefore, that the non-syntactic conditions on what kind of NP may undergo Raising can be reduced to just one necessary condition: that the NP in question constitutes a "good" topic. This is a very relative and context-influenced notion, which is appropriate as a description of very relative and context-influenced judgments of well-formedness. Topic itself cannot be defined with the kinds of objectively definable tests for category membership that apply to syntactic constituents (cf. Zwicky, 1977). Violations

of the "good topic" condition should not produce syntactically ill-formed structures, and I think that this prediction is in accordance with the facts. Compare a sentence with a raised NP of the wrong degree of topicness with a case where a non-subject has been raised, or where the complementizer is that:

(26a) ?We believe the slightest discrepancy to be irritating to him (Borkin, Note 1, p. 73).

(b) *We believe him for loud music to be irritating to.

(c) *We believe corn pollen that causes allergies.

There is a clear difference between (26a) and (26b),(c). No amount of familiarity with the context or imagination is going to make the latter two sentences sound like English. (26a) has more of a pointless quality than actual ungrammaticality.

To conclude this section, and to account for Borkin's condition on the contents of the complement clause, I will invoke a similar solution. The raised NP must be a good topic, and the rest of the complement clause must be a good comment, and express something about the referent of the topic NP. For the utterance to have a point, the material predicated about the topic NP ought to be a fairly significant quality. The generic or stative or non-temporary quality that Borkin notes is probably due in large part to the tenseless character of infinitives, which as Riddle (1975) points out, are generally associated with non-specific time reference. That clauses, on the other hand, have overtly marked tense, and if corresponding infinitive and that clauses are compared, it is the finite clause which will be interpreted as having reference to a specific event. Finally, the subjective

quality of the content of the complement clause follows from the nature of the verb in the higher clause.

If we look at the verbs which allow Raising and where "meaning" and acceptability seem to be affected by the factors discussed above, we find that they have the common property of being epistemic, of expressing information about the truth of the proposition in their complements. None of them are true factives,[4] whose complements are presupposed to be true; if the complement is already assumed to be true, it would be pointless if not contradictory to add hedges or qualifications about the grounds for believing that the proposition in the complement is true. Kiparsky and Kiparsky (1971) note that Raising does not apply if the verb in the higher sentence is factive. It would be contradictory to presuppose a proposition and then describe the grounds for belief as imperfect.

The array of verbs given below overlaps considerably with the so-called "assertive" verbs of Hooper and Thompson (1973), which are in some metaphorical sense transparent. When they govern Raising, they are superordinate syntactically, but semantically peripheral or pragmatically subordinate.[5]

(27) Raising to Subject:

seem

appear

unlikely/likely

strike

happen

Even happen is an epistemic verb rather than an aspectual verb. What it conveys in (28) has little to do with the occurrence of events.

(28a) It happens that Chris has asthma.

(b) Fred happens to be a good friend of mine.

Rather, the use of happen, especially with propositions describing non-events, conveys that the proposition is true, but accidentally so. Expressing some necessary logical or mathematical truth with happen can only be interpreted as sarcasm:

(29a) 2 + 2 happens to equal 4.

(b) n + 1 happens to define n's successor.

(c) Dogs happen to be mammals.

(30) Raising to Object:

(a) believe	(b) say
think	declare
know	state
suppose	assert
guess	announce
consider	report
assume	reveal
regard (as)	disclose
perceive	confirm
presume	prove
establish	show
understand	demonstrate
recognize	

The verbs in (30) fall into two natural groups, which may actually overlap (e.g., in report). Group (a) includes verbs of belief and perception.

Judgments of "meaning" differences have been usually reported about raised sentences with one of these verbs. Group (b) contains verbs which describe a speech act, such as assert, or some aspect of a verbal act, for example, disclose. When the complements of these verbs are actually the main point of the utterance, the higher clause and in particular its verb serve a kind of weak modifying function. Either the basis of the asserted proposition is expressed--belief or supposition etc.--or the manner in which the proposition was conveyed is described. In either case, the contents of the higher clauses are redundant in that they are inferrable--that there are grounds of some sort for the speaker's belief in the asserted proposition.

If someone asserts the proposition in (28), it can be assumed from the fact that the assertion was uttered sincerely that the speaker thinks p, believes p, and the speaker has grounds for believing p. (Sincerity and other conditions on speech acts are discussed in Searle, 1969.) Saying (31) is often not really different from saying the corresponding sentences in (32):

(31a) The train stops at Rantoul. (, because the conductor said so.)

(b) It's raining outside.

(c) The dog is friendly.

(32a) The conductor says that the train stops at Rantoul.

(b) I think it's raining outside.

(c) I believe the dog is friendly.

The (32) sentences are just hedged about with respect to the speaker's certainty. These sentences, without Raising, may be understood as counting almost as simple assertions of the complement proposition. In structures

in which Raising has applied, I find it more likely that the sentence will be understood as an assertion primarily of the complement, and only peripherally of the epistemic higher material.

There are several important consequences of this observation. If the higher material is understood not as the primary assertion, but as some epistemic adjunct, then it is not clear that the higher clause should count in the assessment of the truth of what is asserted (questioned), etc., at least on the non-literal reading of (32). That is, its truth or falsity is independent of the truth or falsity of the complement. The higher material would have to be judged for truth or falsity by the same means, whatever they may be, that assign the values true or false to speech acts, or which mediates between speech acts (felicitous or infelicitous) and propositions within speech acts (true or false). The kinds of extra "meanings" conveyed by raised structures are epistemic, more relevant to the grounds for belief in a proposition than in the contents of the proposition itself. "First-hand knowledge" is a notion which is not uncommonly expressed in human language, usually by some morphological category, such as aspect or mood. It is somewhat unusual, perhaps, for this sort of meaning to be associated with the application of a transformational rule, but I think that an explanation of this fact can be found.

Meaning can be associated with utterances on some occasions without being part of the meaning of the sentence uttered. That is, it need not be meaning expressed by the lexical items in the sentence or their grammatical relations (cf. Grice, 1975). I propose that the kind of "meaning" which is associated with Raising is an instance of meaning conveyed by

"conversational implicature," meaning which does not affect the truth conditions of the sentence it is associated with (cf. Schmerling, 1978). Of the tests for the presence of implicated meaning, given in Grice (1975) and further discussed in Sadock (1978), three are consistent with this hypothesis, and results of the fourth are indeterminate.[6] The evidence for implicature in this case is discussed in the following pages.

If the special meaning associated with raised structures is epistemic, and qualifies the speech act as a whole and not just the asserted proposition, then it is unlikely that presence of the special meaning can affect the truth value of the propositional contents of the sentence; conversational implicature does not change meaning. Second, the special meaning can be asserted separately without redundancy, as in (33a).

(33a) Caesar struck me as fussy; I had known him for years and seen him in many situations.

(b) It struck me that Caesar was fussy; I had known him for years without realizing this.

The "first-hand knowledge" meaning is also compatible with the unraised version, (33b). Implicated meaning, unlike presupposed or lexical meaning, can be separately asserted. Third, the special meaning can be "calculated," derived by some chain of reasoning from the sentence's contents and general maxims for cooperative conversation (Grice, 1975). In this case, the relevant maxim is the Maxim of Manner; if the speaker has a choice of form to express what is to be said, then the particular choice may convey something in excess of its actual meaning. More on this subject will be discussed below.

The extra "meaning" is hard to cancel without contradiction. Normally implicated meaning can be cancelled. Because of the entailment relation

between the "extra" meaning and the literal meaning, it is hard to cancel just the "extra" meaning without also contradicting the rest.

(34a) Caesar struck me as honest, I read all of the historical descriptions of him that I could find.

(b) ?Caesar struck me as honest, though I don't have any special first-hand knowledge of him.

(34a), which many speakers find well-formed, may either be an instance of successful cancellation of the "first-hand knowledge" meaning or a case of reinforcement, where acquaintance with historical facts counts as first-hand knowledge.

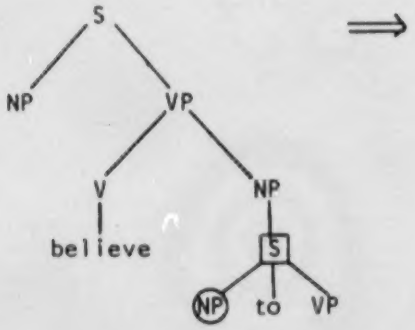
My proposal, therefore, is that the special properties of sentences related by rules of Raising are actually conversationally inferred from sentence surface structures, rather than being part of the conditions on the rules or of the deep structures which the rules apply to. This proposal is not the first to make use of a solution of this type. Schmerling (1978) describes some sentences which can be accounted for either by Raising to Object or by Equi-NP-Deletion, but not both. She proposes that the differences of meaning which appear to support the Equi-NP-Deletion analysis are actually the result of conversational inferences based on real-world knowledge, rather than underlying differences of grammatical relations.

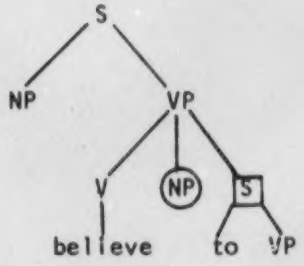
Steever (1977) also makes use of conversational inference in describing the differences between structures in which Raising has applied and those where it has not applied. He argues that the structure resulting from the application of Raising is in some sense the more "usual," which fits more closely than the unraised structure the normal syntactic patterns of English surface structures. For him, it is the unraised structure which is "marked"

structure, or the unusual case, the one which has some extra, distinctive characteristics which separate it from the normal case. He bases this description on an analogy with other structures of English, which are illustrated below.

The analogy that Steever draws hold between structures consisting of two underlying clauses. In one case, Raising to Object applies, as in (35a) and (b):

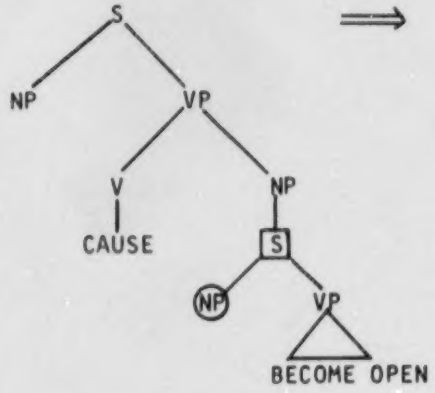
(35) Raising to Object

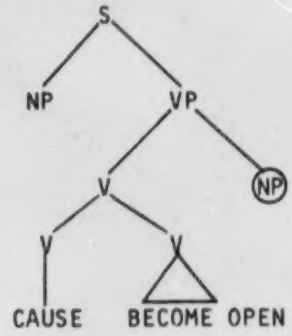
a. 

b. 

In the other case, a transformation called Verb Raising applies, as in (36a) and (b):

(36) Causatives - Verb Raising with Clause Union

a. 

b 

= open

The operation of this rule is discus d in Aissen (1974). I think it is correct to say, as McCawley (1978) proposes, that the "marked" or unusual form for causative sentences is the structure in which Verb Raising has not applied, or (36a). But I think that the analogy is misleading, and that what is true of causative sentences is not true of other biclausal structures in which the Raising rules may apply.

My impression is that it is the raised structure, such as (35b), that has special or restricted meanings associated with it, even though speakers are sometimes inconsistent and variable; Borkin (Note 1) seems to share this judgment. As a second point which would support my observation over Steever's, Raising rules are governed. That is, they can apply only if the verb in the higher clause belongs to a certain class of verbs, which includes believe, but not, for example, write. So, for the most part, the structures of the type illustrated in (35b) have counterparts with that and an unraised NP in (35a), but not every sentence with the form (35a) has a Raised counterpart like (35b). Begin and a small number of other aspectual verbs constitute an exception to this statement.

Finally, the very general schemas for left-to-right parsing of surface structures, described on page 8 and following, match the unraised structures more closely than the raised structures, at least with respect to how clearly underlying logical relations are represented in surface structure. Structures which deviate from the schemas which fit many well-formed surface structures are not necessarily ill-formed, but they do require more effort in processing.

McCawley (1978) notes that a difference of "meaning" is perceived if two structures are available in the language which communicate roughly the same thing, as illustrated in (37) and (38):

(37a) Laura opened the door.

(b) The soot blackened the paper.

(38a) Laura caused the door to be/become open (and she's only 4 years old).

(b) The soot caused the paper to become black.

(37a) and (b) suggest some indirect, non-ordinary means of causation. The (38) sentences convey something different from the (37) sentences by virtue of their apparent marked character, not because of hidden underlying abstract meaning elements. There is some support for this notion, in that passive sentences convey something different from their active counterparts, particularly if they are in any way unusual as passive sentences.

(39a) Fred sat on this chair.

(b) Napoleon drank from this cup.

(40a) This chair has been sat on by Fred.

(b) This cup was drunk from by Napoleon.

The sentences in (40) convey more strongly than (39) that (a) the chair is materially affected, and (b) the cup is interesting or notable; this follows from the unusual promotion of a prepositional object to subject, and from the topic position of the derived subject (see Davison, 1980).

To return to the analogy of causative structures to raising structures, one reason that I believe that the analogy is not justified is that to make the analogy involves comparing two different kinds of surface structures.

In the case of Verb Raising, the embedded clause is wholly incorporated into the higher clause, and loses its sentence boundaries. As Borkin (Note 1) shows, there is little or no evidence that clause union occurs in the case of Raising. The internal sentence boundaries seem to persist, particularly in the case of to complements. The initial and derived structures seem to be as illustrated in (35) and (36). Note especially the differences between (35b) and (36b).

Hence the structures which convey extra meaning by conversational implicature will be (38a) and (b) (see McCawley, 1978, for discussion of direct and indirect causation in English). The marked structure (35b) is also the one which is the result of rule application under a very stringent set of conditions. These are the necessary conditions summarized from Borkin (Note 1), which I have reinterpreted as conditions on topic NPs and reference to specific events.

I now want to return to the questions raised in the first sections of this paper: whether readability can be assessed for specific constructions, in addition to randomly chosen sample passages for which an average is computed; and whether the difficulty of a given construction is related in a systematic way to other factors in the discourse. We have seen a certain number of reasons for regarding raised structures as more difficult than unraised structures. The internal relations are obscure; and the whole compilation is well-formed under a set of not very clearly understood conditions. But if this were the only thing to be said, I would not have chosen this case to go on at great length about. I want to argue that the

very factors which have caused linguists so much descriptive pain are exactly the factors which define function of such sentences in discourse.

That is, structures in which Raising has applied are indeed likely to be difficult to interpret except if they are used in the optimal discourse context. If the raised NP forms a "good" topic in that discourse, and if the speaker wants to qualify the proposition it is in with some other predication giving the epistemic basis for the proposition, then the raised structure is the best way to do it. The structure itself has iconic properties; that is, its structural properties can be regarded as expressive in themselves. The raised NP is either in topic position or in another position in the higher clause, separated from its clause of origin. Raising to Object moves the subject of the lower clause into the object position occupied by the subordinate clause, as in (35a) and (b).

It is interesting to note that the output of Raising and the input more or less to Verb Raising (cf. Aissen, 1974) are similar in structure, at least if regarded as a string of constituents:

(41a) John caused the door to be/become open.

(b) John believed the door to be open.

Though one is the result of the non-application of Verb Raising[7] (41a), and the other is the result of the application of Raising, they are both marked structures. Markedness should be determined by what contrasts are available.[8] In this case, the relevant contrasts are:

(42a) John caused the door to be open. (marked)

(b) John opened the door. (unmarked)

(43a) John believed that the door was open. (unmarked)

(b) John believed the door to be open. (marked)

(42b) is much shorter and the information in it expressed much more compactly than (42a). The grammatical relations in (42b) are clear, and there are no internal clause boundaries. In (43a), the internal clause is clear because it is marked by the complementizer that and the tensed verb. The grammatical relations in each clause are marked by word order.

In (42a) and (43b), the grammatical role of the second NP is ambiguous, and the clause boundaries of the internal clause are not explicitly marked. The contrast with more transparent and straightforwardly marked structures justifies calling the pair of sentence types in (41) above the marked members of the contrasting pairs of related sentences. At the same time, the higher clause is rendered less prominent than the lower clause. The higher clause contains the epistemic modification of the proposition expressed in the lower clause, which is often taken to be the "main" assertion in the sentence at the expense of what is syntactically higher.

The raised structure is consistent with lowered prominence for the higher clause. The lack of distinct markers of a full subordinate clause and the fact that the subject or object in the higher clause is a member of the lower clause also, suggest--or convey conversationally--that the epistemic material is to be subordinated to the rest. Thus the raised structure does two discourse-related jobs at once, in an economical fashion by comparison with alternative means:

(44a) Scientists believe allergies to be partly of psychosomatic origin.

(b) Allergies are partly of psychosomatic origin, or so scientists believe.

(c) Speaking of allergies, scientists believe that they are partly of psychosomatic origin.

What is conveyed separately by (44b) and (c) is conveyed at one fell swoop by (44a)--that is, that allergies is the topic, and scientists' belief is the basis for the assertion.

Conclusions

In preceding sections, I have reanalyzed the long list of conditions and restrictions on what may be raised and out of what, into a small and general specification, that is phrased in terms of topic and comment. Raising, I have argued, is sensitive to pragmatic properties, such as what kinds of reference to individuals is generally conveyed by a given type of NP--as defined by its form, and by the discourse it occurs in. The condition on the NP as "good" or actual topic is a necessary condition for Raising, but not a sufficient one. I have not found anything to label a sufficient condition in English. The special meaning associated with the raised version is also compatible with the unraised version, though this does not seem to be the case for Japanese (Tomoda, 1976-77). But the special meaning--first-hand knowledge, predication directly about an individual, etc.--is conveyed by the raised structure, to the exclusion of the neutral meaning which is nevertheless entailed by it. I have accounted for this meaning as a case of conversational implicature. It is conveyed by the choice of the "marked" syntactic form, determined by the contrasts which the language permits.

The set of necessary conditions and the generalized conversational implicature together give raised structures some very particular though non-syntactic properties. They make raised structures more restricted and "difficult," but also more distinctive, and therefore exploitable for expressive purposes.

Linguists are interested in how people acquire linguistic competence and what this linguistic competence consists of--perhaps also how it manifests itself in tasks in which language is crucially involved. Linguists interested in syntax, such as myself, are interested in regularities of structure, in the formal mapping of one structure onto another, captured as operations such as permutation, feature changing, and transformational rules such as Passive, Adverb Preposing, and Raising. But any extended serious scrutiny of such matters will turn up unexpected conditions on rule operations, aberrant cases where an otherwise optional rule may not, or must apply, where strange shades of meaning are attached to structures where there is no explicit expression of such meaning.

One solution is to reject transformational rules entirely, in favor of direct generation of the separate surface structures supposedly related by a transformation, substituting interpretive conventions in its place, or other means of accounting non-transformationally for facts about case-marking and reference (cf. Chomsky & Lasnick, 1977, etc.). Another approach, which turns out to be not much more illuminating than the previous one, is to attach exception features and complex semantic material to constituents in remote structure, which--in the case of the semantic material at least--is never overtly realized in the derived structure. (See Green, 1974;

Postal, 1974, for descriptions of some of the non-syntactic factors affecting the application, and pp. 20-23 of this paper.)

I want to argue that there is another way. Linguistic ecologists interested in clean-burning syntactic rules would want to do away with such unpleasant smoggy emissions of rules as currently conceived of, in favor of a fairly parsimonious syntax plus an improved understanding of how syntactic structures are used to communicate meaning in discourse. That is, not all meaning is to be considered a function of linguistic structure alone, as extralinguistic conventions about language use may also play a part, perhaps derived from the purposes to which language is put in the (so-called) real world.

Linguistics and reading have not had a very close association, though both disciplines have a common interest in how people process (comprehend, produce) linguistic material. Lots of factors intervene in the teaching of reading which are of little interest in themselves to linguists interested in linguistic structures. In teaching reading, there are problems arising from lack of shared cultural knowledge, reflecting majority/minority culture differences, or class and cultural differences.

But if my account of Raising rules is correct--and I think such accounts are plausible and deserve to be tested--and if such accounts can be articulated in a way which is comprehensible outside the trade of linguistics, then possibilities open for more challenging and effective reading materials. Once the discourse functions of allegedly "difficult" constructions are better understood, perhaps writers for younger readers will be bolder about using them, in appropriate contexts adapted to their function. Greater variety

of style, and the opportunity to handle more complex material in language, would be the result. In trying to find such solutions, the goal of both linguistics and the teaching of reading would be better served.

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Footnotes

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[1]It is foolhardy to lay out categorical definitions of topic, which I do not consider a semantic or syntactic category. But here I am assuming that preverbal subject position in English is associated with the topic of a sentence; that each sentence has one topic, though it may not be clearly definable for every sentence, and that the topic NP of a sentence is related to what is clearly perceived as the general topic of the discourse in the context of which the sentence is uttered.

[2]The syntactic details are grossly simplified here.

[3]Generic NPs which are not anaphoric are of middling acceptability in raised structures:

(i) We believe that mules are hybrids.

(ii) ?We believe mules to be hybrids.

[4]Know allows raising, but it is not always used factively.

[5]Main clause phenomena tend not to occur in factive structures.

[6]I follow some of the discussion in Steever, 1977, very closely, but not all of it.

[7]Though Clause Union and Verb Raising have not applied, the NP subject of the lower clause has been raised.

[8]McCawley (1978) notes that there is a difference in the interpretation of causatives in just the cases where there is a difference between a single verb, such as open, and a periphrastic expression such as cause to be(come) open; the single word is neutral and the periphrastic form conversationally implies indirect causation. Where there is no lexical form which encode causation and some other predicate, then the periphrastic form is used, e.g., cause to drop one's parcels (ibid). The periphrastic form conveys no special notions of indirect causation where there is no contrast of form possible.

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